lings of various species of Pinus which have grown in the dark, inasmuch as it has long been known that these plants become green in darkness.

This paper cannot be regarded as other than a most important contribution to our knowledge of the physiology of plants, and it will be readily admitted that Prof. Pringsheim's theory of the function of chlorophyll is at least as satisfactory as any which are now current. But although the number of facts upon which the theory is based is large, yet the evidence in favour of it can hardly be considered to be complete at present; there are certain points which require further elucidation. For instance, Prof. Pringsheim regards the chlorophyll of a corpuscle as undergoing no change under ordinary circumstances, but it is difficult to reconcile this view with the fact that an alcoholic solution of chlorophyll loses its colour under the same circumstances. Then again, as to the source of the reducing energy in the process of assimilation, if the rays absorbed by the chlorophyll are not directly concerned in it, it is most desirable that more information should be obtained as to the nature of the rays which are active, and as to the particular cell-contents which absorb them. Further, the correctness of the principle that an increase in the intensity of light to which a cell is exposed produces an increase of its respiratory activity, needs more direct and general experimental confirmation than is given here. In his views as to the respiratory function, he appears to insist too strongly that the chlorophyll-corpuscles are to be regarded not only as assimilatory, but also as respiratory organs. It is not easy to see that any of the observations which he gives in this paper directly suggest such a view; on the contrary, they tend rather to show that exposure to intense light increases oxidation in the *whole* of the protoplasmic cell-contents. Prof. Pringsheim evidently desires to bring out that hypochlorin is *the* substance which undergoes oxidation in the cell, and since it is present exclusively or nearly exclusively in the chlorophyll-corpuscles, he considers that these bodies are the especial seats of the respiratory process. His observations, however, do not warrant this conclusion; what they prove is that the hypochlorin in the chlorophyll-corpuscles is oxidised when they are exposed to intense light in an atmosphere containing oxygen, and that certain changes (including a loss of substance) take place in the rest of the protoplasm, in consequence, doubtless, of the excessive oxidation of some substance or substances which it contains. His view may be fairly met with the *à priori* objection that it is highly improbable that the same organ should be the seat of two such opposite functions as respiration and assimilation. The true physiological significance of the chlorophyll-corpuscles becomes apparent when it is borne in mind that assimilation does not take place in cells which do not possess them, whereas respiration proceeds actively, perhaps most actively, in such cells.

And, finally, as to hypochlorin, it is to be hoped that a method will be devised for the extraction of this substance in such quantities as to allow its properties to be studied and its chemical composition to be ascertained. The curious fact that hypochlorin cannot be detected in plants which are not distinctly green (Diatomaceæ, Fucaceæ, &c.), is worthy of further investigation.

These desiderata may perhaps be supplied in the future publications on this subject which Prof. Pringsheim promises. SYDNEY H. VINES

NOTES

WE take the following from the *Times*:—At their meeting last week the President and Council of the Royal Society selected, from the whole number of fifty-two candidates for the fellowship, the following fifteen to be recommended to the Society for election at the annual meeting on June 2 next:—W. E. Ayrton, H. W. Bates, J. S. Bristowe, W. H. M. Christie, G. Dickie, A. B. Kempe, A. Macalister, H. McLeod, J. A. Phillips, W. H. Preece, B. Samuelson, M.P., B. B. Stoney, R. H. Traquair, Rev. H. W. Watson, C. R. A. Wright.

A *conversazione* of the Society of Telegraph Engineers was held in honour of Prof. Helmholtz in the rooms of University College on Monday night. Among those who were present to meet the guest of the evening were many eminent English men of science. Many of the members of the Society and other had lent instruments and apparatus showing some of the purposes to which electricity has recently been applied, and also the means by which electrical research is still being carried on. On entering the College grounds the visitors saw a very pretty effect caused by one of Mr. Crompton's electric lights, which had been placed on the top of the portico. The reception-room itself was lit up with little incandescent electric lamps on Mr. Swan's principle. They were arranged in bunches of three or four in ground glass globes suspended from the ceiling, and in fact at first sight they looked like very brilliant gas-burners, no wires being visible. On each side and down the centre of the room were placed tables on which were arrayed all the newest inventions in electrical science. On one it was demonstrated how perfectly easy it was to manage Mr. Swan's lamps; taking one lamp out of the stand and putting in a new one occupying only a few seconds, there being no binding-screws or switches to attend to. Perhaps the most interesting experiment of the evening was the transmission of pictures of natural objects by telegraph, the picture of a butterfly being most beautifully transmitted by means of a selenium plate. This was shown by Mr. Shelford Bidwell's telephotographic machine. Mr. Latimer Clark exhibited some rare books on electricity and magnetism, autographs and portraits of eminent electricians; also a portion of the original telegraph line which was laid by the late Sir Francis Ronalds in 1816, with the original model of Ronalds' telegraph, the original type cast for the Morse telegraph, with autograph of Prof. Morse, and a portion of line laid by W. F. Cooke in 1837. Mr. Cotterell of the Royal Institution exhibited a very delicate mercury electrometer on Lippman's principle, belonging to Prof. Dewar; and Mr. Robert Sabine performed some pretty experiments illustrating the cause of the motion of the mercury. Mr. Stroh showed the beautiful apparatus made by him to illustrate Prof. Helmholtz's vowel theory, and Mr. Preece performed several experiments in explanation of the remarkable sounds produced by intermittent light on solid, liquid, and gaseous matter. Mr. George Lund, of the firm of Messrs. Lund and Blockley, exhibited some synchronous clocks for the London, Chatham, and Dover Railway Company for coupling up two ordinary telegraph lines at 10 a.m., in order to send the time current. They also applied to the clock a novel automatic arrangement of their own invention, by which, at two minutes to 10 a.m. daily, the current will ring a warning bell, couple up and block against false currents two ordinary telegraph wires, then at 10 a.m. the clock sends the time-current of two seconds' duration, giving time to the clocks in circuit. Immediately upon the termination of the two seconds' current the lines will be automatically re-established as distinct lines for their ordinary telegraph purposes. All present were pleased to have the opportunity of inspecting Prof. Kennedy's engineering laboratory, where the machine for testing the strength of materials up to fifty tons was seen in operation, and various pieces of brass and copper were tested. The machine-tools were in operation, and a steam-engine of peculiar construction driving them. We look forward with interest to the scientific results we may expect to be brought to light with the testing-machine. The President (Prof. Carey Foster) showed some interesting electrical instruments; Mr. Richard Anderson a portable galvanometer for testing lightning-conductors; Professors Ayrton and Perry a variety of apparatus, as also Siemens Brothers, Newall and Co., and others. Prof. Helmholtz ended on Tuesday his visit to London, and went with Mr. Spottiswoode, president of the Royal Society, to his country house at Coombe Bank, Sevenoaks. From thence he proceeds to Dublin to receive an honorary doctor's degree from the University of that city.

THE National Fisheries Exhibition will be opened at Norwich by the Prince of Wales on the 18th inst. The delay in opening it has been caused by the necessity for enlarging the space to admit of satisfying the numerous applications that have poured in. Every point connected with the growth and nurture of fish, the modes of capturing them, the condition of the fishermen will be illustrated. The aquatic fauna of Norfolk and Suffolk will be a special feature, as also fish-eating birds. The Earl of Ducie, Viscount Powerscourt, Lord Lovat, Mr. Spencer Walpole, and Prof. Huxley, H.M. Inspectors of Fisheries; and Mr. Calcraft, Permanent Secretary to the Board of Trade, have been appointed by the Home Secretary to act as Her Majesty's Commissioners. In addition to a large number of special money prizes, Government gold, silver, and bronze medals, diplomas of honour, will be awarded by the jurors. Prof. Huxley will give an address on the occasion.

MUSEUM No. 1 in the Royal Gardens, Kew, will be reopened to the public on Easter Monday, after being closed during the winter. It has been enlarged by the addition of a new wing, terminating in a wide staircase with ascending and descending flights. The expense has been borne by the India Office in consideration of the maintenance at Kew of the botanico-economical collections recently forming part of the India Museum. The whole collections have been entirely re-arranged by the curator, Mr. John Jackson, A.L.S. On the staircase has been placed a large painted window, presented to the museum by Alderman W. J. R. Cotton, M.P. This window represents the successive stages of cotton cultivation and manufacture. Amongst other recent additions to the museum may be mentioned a series of models of farm and garden vegetables prepared and presented by Messrs. Sutton of Reading; a collection formed by Col. Pearson, who has charge of the Indian forest-students at Nancy, of the various objects manufactured in France from native-grown woods; a further series of vegetable products and manufactured articles, collected in Afghanistan by Surgeon-Major Aitchison. The collection of portraits of botanists has also been much enlarged and re-arranged. An oil portrait of Thomas Andrew Knight, F.R.S., well known for his classical researches in vegetable physiology, has been presented on behalf of the family by Sir Charles Rouse Boughton, Bart.

THE President of the United States of America has notified to the French Government his intention of appointing a special commission to preside over the arrangement of the American Section at the Electrical Exhibition. A number of commissioners have been already selected for the purpose. M. Philippart has written to M. Berger, placing at his disposal a sum of 4000*l.* for the best system presented of transporting electric force at a distance.

ON Sunday week a deputation composed of eminent representatives of French science waited upon the venerable M. Milne-Edwards to present him with a medal in commemoration of the completion of the great naturalist's work on Comparative Physiology and Anatomy. Warm congratulatory addresses were made by MM. Quatrefages, Blanchard, and Dumas, the last speaking of himself as the oldest of M. Milne-Edward's friends. In thanking the deputation the recipient of this well-earned honour was naturally much moved.

ON March 26, in presence of the Minister of the Interior, the Commission of the Observatory, several State functionaries and men of science, there were repeated at the Brussels Observatory experiments with Van Rysselberghes' telemeteorograph, which prove that the registration of the meteorological elements by this instrument may be made automatically at very great distances (several hundred kilometres). The author explained to the Minister a plan of International Telemeteorography, the realisation of which would be of the greatest utility for the scientific study of the atmosphere, and which would render possible the prevision of the weather.

THE destruction caused by the Chios earthquake has been even greater than we stated last week. The Constantinople Correspondent of the *Daily News* sends some interesting particulars: The temperature on the 3rd was heavy and oppressive, and the horizon was broken by broad flashes of light that seemed to denote a coming storm. In all this atmospheric disturbance however the inhabitants saw nothing extraordinary, and were far from being alarmed by what they fancied would result in a thunderstorm. At ten minutes to two in the afternoon a terrific shock was felt, bringing three-fourths of the houses in the town to the ground like so many packs of cards, and burying a thousand persons under the falling ruins. Then commenced a fearful scene of horror. The ground rocked and danced, kneading the ruin already formed into an unrecognisable mass of stone. The survivors ran hither and thither, not knowing where to flee to escape the horrible fate that menaced them, and were tossed and flung about by the heaving earth, like feathers in a breeze. Even those who gained the open country were by no means safe. The earthquake attacked not only the towns and villages, but worked its ravages in the hills and mountains of the island. Enormous masses of rock and earth came rushing down the hill-sides, carrying all before them, bounding far into the plains, and tearing roads in the solid rocks of the mountain such as might have been formed by a torrent a thousand years old. The town presented a pitiable spectacle. Great fissures and crevices yawned in the streets, walls were falling with a crashing report, and entire buildings crumbled in fragments to the ground. In many places whole streets had disappeared, and it was hard to say where the different well-known buildings had stood. The ground still heaved and tossed, bringing fresh buildings to the ground at every moment, and hurrying innumerable victims to destruction. It is impossible to say what the number of victims would have been if a second shock had not displaced the ruins formed by the first and thus permitted thousands of sufferers to escape or to be rescued by others from the horrible imprisonment to which they had been condemned. All the fissures and crevices run from east to west. In the country the effects of the horrible upheaval have been even more terrible than in the town. The shocks are now, April 8, diminishing. In all there were counted 250 since the first three awful upheavals which destroyed the greater part of the island. A telegram of the 12th states that earthquake shocks of considerable violence have recommenced in Chios, and it is estimated that barely twenty houses now remain habitable in the whole island. Forty-five villages have been totally destroyed, and in many localities the population has absolutely disappeared.

SOME slight shocks of earthquake were felt on the morning of the 5th inst. at San Cristobal, Cuba. A violent shock was felt at two o'clock on Sunday morning throughout the centre of California. Earthquakes were reported from South Hungary on Wednesday last week.

THE *Daily News* Naples correspondent, telegraphing on the 6th, states that Mount Vesuvius was displaying greater activity. Abundant streams of lava were descending northwards, and great numbers of smoke fissures had opened round the crater, some at 100 metres distance from the centre of eruption.

PROF. C. V. RILEY has just published, in the Second Report of the United States Entomological Commission, "Further Facts about the Natural Enemies of Locusts," meaning, of course, by the latter term, the Rocky Mountain pest in particular. His observations entirely concern insect parasites. The most interesting are on the habits of two species of *Diptera*, allied to *Bombylius*, the larvæ of which feed on the eggs of "locusts." The plate (xvi.) illustrating the subject is above praise, not only on account of the scientific accuracy shown in the drawings (which are by the author), but also as regards the reproduction of them by the "lithocaustic" process adopted by a Baltimore firm. We have seen other plates of entomological subjects emanating from the same firm, and the impression formed on our mind is that no other process is equally adapted for the purpose. Why cannot some of our own enterprising "lithographers" produce the same result?

THE following are the lecture arrangements after Easter, at the Royal Institution:—Prof. Dewar, M.A., F.R.S., six lectures on the Non-Metallic Elements, on Tuesdays, April 26 to May 31; Prof. Tyndall, D.C.L., F.R.S., six lectures on Paramagnetism and Diamagnetism, on Thursdays, April 28 to June 2; Prof. H. Morley, three lectures on Scotland's Part in English Literature, on Saturdays, April 30, May 7, 14; one lecture on Thomas Carlyle, on Tuesday, June 7; Mr. E. C. Turner, Lector at the University of St. Petersburg, five lectures on the Great Modern Writers of Russia, on Saturdays, May 21, 28, June 4, Thursday, June 9, and Saturday, June 11. The Friday evening meetings will be resumed on April 29, at 8 p.m. Prof. J. S. Blackie, F.R.S.E., will give a discourse on "The Language and Literature of the Scottish Highlands," at 9 p.m. Succeeding discourses will probably be given by the Hon. G. C. Brodrick, Mr. Francis Galton, Mr. W. H. Pollock, Prof. H. E. Roscoe, Prof. W. G. Adams, and Prof. Dewar.

THE usual course of Mayfair Lectures will commence, under the auspices of the National Health Society, on Friday, April 22, at 23, Hertford Street, Mayfair. The list of lecturers will this year include the names of Dr. Siemens, F.R.S., Dr. Robert Farquharson, M.P., and Prof. Fleeming Jenkin.

WE are glad to find from an announcement in the current number of the *Quarterly Journal of Microscopical Science* that Dr. C. T. Hudson, of Manilla Hall, Bristol, is preparing a volume for the Ray Society on the "British Rotifers." Dr. Hudson is known not only for his numerous contributions to our knowledge of this group, but especially for his discovery and excellent illustrations of one of the most important members of the group (Pedalion). Dr. Hudson will have the advantage of the use of Mr. P. H. Gorse's beautiful drawings of Rotifers, which that observer has placed at his disposal.

A LARGE party of the Members of the Geologists' Association were on Saturday last conducted through the Geological Department of the British Museum (Natural History), South Kensington, by Dr. Henry Woodward, F.R.S., &c., the Keeper of that Department.

Apropos of the meeting of the French Association at Algiers the *Revue Scientifique* for April 9 devotes most of its space to a series of articles on Algeria, its colonisation, statistics, botany, anthropology, hygiene, and zoology.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. R. J. Short; a Common Paradoxure (*Paradoxurus typus*), from India, presented by Mr. C. W. C. Fletcher; a Viverrine Cat (*Felis viverrina*) from India, presented by Major C. R. Oxley; two Squirrel-like Phalangers (*Belideus sciureus*) from Australia, presented by Mr. D. W. Barker; three Paradise Whydah Birds (*Vidua paradisea*), a Pintailed Whydah Bird (*Vidua principalis*), a Red-shouldered Weaver Bird (*Urobrachya axillaris*), a Red-beaked Weaver Bird (*Quelea sanguinirostris*), a Wiener's Finch (*Pytelia wieneri*), two Yellow-rumped Seed-Eaters (*Crithagra chrysopyga*) from Mozambique, presented by Mr. Maurice C. Angel, F.Z.S.; two Laughing Kingfishers (*Dacelo gigantea*) from Australia, presented by Mr. Edward Trelawny; an Alexandrine Parrakeet (*Palæornis alexandri*) from India, presented by Mr. Henry Day; a Common Gannet (*Sula bassana*), British, presented by Mr. G. Randall; a Common Marmoset (*Hapale jacchus*) from South America, deposited; an Indian Chevrotain (*Tragulus meminna*) from India, six Weeper Capuchins (*Cebus capucinus*) from Brazil, four Chestnut-eared Finches (*Amadina castanotis*) from Australia, three Common Crowned Pigeons (*Goura coronata*) from New Guinea, an American Tantalus (*Tantalus loculator*) from South America, purchased; two Sclater's Curassows (*Crax sclateri* ♂ ♀) from South America, on approval; an Indian Darter (*Plotus melanogaster*) from India, received in exchange.

GEOGRAPHICAL NOTES

THE Royal Medals of the Geographical Society have this week been awarded as follows:—The Founder's Medal to Major Serpa Pinto, "for his remarkable journey across Africa, from Benguela to Natal, during which he explored nearly 500 miles of new country, defined the fluvial systems of the southern slopes of the Benguelan Highlands, and fixed the position of numerous places by a series of astronomical observations; also for the admirable account of his journey, now in course of publication in London, containing numerous original maps, tables of observations, and a large amount of valuable and exact information regarding the African interior;" and the Patron's Medal to Mr. Benjamin Leigh Smith, for his discoveries on the south coast of Franz-Josef Land during last summer, as well as for his previous expeditions along the north-east land of Spitzbergen.

AT the meeting of the Geographical Society on Monday last Mr. R. N. Cust read a paper by Col. Tanner on Kafiristan and the Siah-posh Kafirs of the Hindu Kush. The paper, which was hardly a geographical one in any sense, dealt chiefly with the inhabitants of the Valley of Dara Nur and the Chugan tribe, and to a less extent with the Kafirs, who are called "Siah-posh" from their wearing black clothes, and furnished some very interesting information regarding their manners and customs. Some philological notes had also been sent by Col. Tanner, but these will be communicated to the Asiatic Society. Some of the more striking passages in Col. Tanner's notes, if we remember rightly, were read at the Swansea meeting of the British Association. As much interest attaches to Kafiristan and the Kafirs, and the results expected from Col. Tanner's expedition were so eagerly looked forward to, it was rather disappointing to be told by Col. Yule that we have even now learned no more than was buried in the record of a Jesuit Missionary's travels some 200 years ago. No doubt had his health not failed at the critical moment, and compelled him to return to India, Col. Tanner would have succeeded in penetrating into Kafiristan itself, and collected valuable geographical information.

THE Society formed at Milan for commercial exploration in Africa is showing increased activity, and has despatched another expedition to Tripoli, under the command of Capt. Camperio, who is accompanied by Signor Cingia, an ex-cavalry officer. The principal objects of this expedition are the exploration of the Gulf of Bomba, and it will particularly examine the ports of Tobruek and Derna, not far from the Egyptian frontier. Capt. Camperio will afterwards make an attempt to penetrate into the interior of the oasis of Jazabud, in order to open commercial relations with its inhabitants.

WE are glad to learn that there is good hope that Col. Flatters and many of his followers, who were reported to have been massacred by the Touaregs, are still alive, though probably retained as prisoners.

DOCTORS SCHWEINFURTH AND RIEBECK, who have been travelling in Egypt, left Cairo last month to explore the island of Socotra. They do not seem to be aware that quite recently